

Improving Project Performance and Waste Reduction in Construction Projects: a Case Study of a Government Institutional Building Project

Abstract

The construction industry plays an important role in establishing the infrastructure required for socio-economic development and directly contributes to economic growth. On the other side, it also generates severe impacts on the environment. The construction industry is one of the biggest environmental polluters and it also consumes large quantities of raw materials. Value Engineering originates from the manufacturing industry in order to deliver higher value and quality to a product by means of an increase in efficiency. ‘Lean Construction’ (LC) concepts emerged as a consequence of the application of VE philosophy, specifically for construction industry. LC extends from the objectives of a lean production system – to maximize value and to minimize waste – in relation to specific techniques and then applies them conceptually in a new project delivery process. The aims of this paper are to present practical examples of the application of Value Engineering and Lean Construction concepts within a green building construction project and to qualitatively assess its benefits in terms of environmental impact and waste minimization. A detailed case study was conducted for project execution of a new multi-storey government institutional building in the Jakarta central business district. This project adopts a Green Building and a Green Site concept in order to reduce potential environmental impact during the construction phase itself and during the occupancy phase of the building. The case study primarily concerns issues such as water consumption, power usage, etc. This project is a perfect example for the application of Value Engineering and Lean Construction philosophies in order to deliver better quality, faster completion, environmentally friendly practice, and less waste generation. The adoption of environmental awareness in the context of building design, the application of alternative and/or recycled/environmentally friendly materials, along with a number of “green” technologies and building systems featured in this building concept will deliver greater value without jeopardizing the ecology. Meanwhile, the adoption of prefabrication construction methods, intelligent excavation works, ‘Reduce-Reuse-Recycle’ principles, and simple ‘environmentally-aware’ on-site practices can minimize the waste produced and the local environmental impact emitted during project execution.